

PATENT SPECIFICATION

DRAWINGS ATTACHED

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960.436



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COMPLETE SPECIFICATION

Improvements in Couplings for Pipes, Rods, Ropes and Electric Cables

5 We, OSKAR BIEGEL G.M.B.H. of 113 Kuhlweinstrasse, Völklingen, Germany, a German Company, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 In British Specification No. 714028 we have claimed a coupling for hose conveying fluid under pressure having a nozzle for fitting into the open end of the hose, a coil spring ring which surrounds nozzle and hose, and clamping members arranged around the hose, nozzle and spring ring, comprising two 15 hollow bodies, screwing one into the other, one of which has a coned surface by which according to the degree of screw inter-engagement of the two hollow bodies the coil spring ring is caused to exert a pressure 20 to a greater or less extent on the hose, which is characterized in that one member of the clamping means is substantially stationary relatively to the hose nozzle whereby the coil spring ring adheres to the hose 25 when the latter has a tensional load applied thereto and moves with the hose towards the smaller end of the coned surface and thus urges the hose radially inwards against the outer surface of the nozzle. The forms of coupling disclosed in Specification No. 714028 are suitable only for flexible hoses and the present invention provides modified forms of coupling which are suitable for use with non-tubular flexible members or with 30 rigid members.

35 The invention provides a coupling for attachment to an elongated non-tubular flexible member of circular cross section, such for example as a rope or an electric cable, 40 comprising an externally screw-threaded tubular body having an internal diameter

which is larger than the external diameter of said member, a nut adapted to screw on to said body and having a conical internal surface and an annular coiled spring which 45 fits over the end of said member and is compressed against it to clamp the member by the conical surface of the nut when the nut is screwed on to the body.

50 The invention includes a coupling for attachment to an elongated rigid tubular or non-tubular member of circular cross section, such for example as a pipe or a bar, comprising a flexible sleeve to fit over said member, 55 an externally screw-threaded tubular body having an internal diameter which is larger than the external diameter of the sleeve, a nut adapted to screw on to said body and having a conical internal surface and an annular coiled spring which fits over the 60 sleeve and is compressed against it to clamp it to said member by the conical surface of the nut when the nut is screwed on to the body.

65 A further modification contemplated by the invention is the substitution of a rubber O-ring for the annular coiled spring used in the couplings described in Specification No. 714028.

70 Certain embodiments of coupling according to the invention are shown in the drawings, the coupling being shown in longitudinal section in each Figure. Like reference numerals indicate like parts throughout the Figures. Figs. 1(a), 1(b), and 2—9 75 accompany the Provisional Specification, and Figs. 10—16 accompany the Complete Specification.

80 In the construction shown in Fig. 1(a), a rigid pipe 10 is fitted into the end of a flexible hose 11 and coupled thereto by a clamping device comprising a tubular body

12 the bore of which fits the pipe 10, a nut 13 adapted to be screwed to the body 12 and having an internal coned surface 14 and an annular coiled spring 15. When the nut is screwed to the body the spring 15 is compressed by the conical surface 14 of the nut against the flexible tube 11 to clamp it to the pipe 10. When fluid under pressure is introduced into the coupled pipe and hose the endwise force causes the spring 15 to be pressed by the conical surface 14 into firmer engagement with the hose 11.

In the double-ended construction shown in Fig. 1(b) the body 12 of the coupling has at one end a rigid spigot 16 which fits in the end of the flexible hose 11. A flexible sleeve 17 is fitted over the end of the rigid pipe 10. Nuts 13 having conical inner surfaces 14 are screwed to both ends of the body and serve respectively to compress an annular coiled spring 15 on to the flexible hose 11 to secure it to the spigot 16 and another similar spring 15 on to the sleeve 17 to secure it to the rigid pipe 10.

The coupling shown in Fig. 1(b) can, as shown in Fig. 2, be modified by making its end portions identical and it will then serve in conjunction with a longer flexible sleeve 17 to couple two rigid pipes together.

Fig. 3 shows a coupling for securing a rigid pipe 10 to a piece of equipment (not shown) which is secured to a threaded portion 18 of the body 12. As before, the nut 13 compresses the spring 15 on to a flexible sleeve 17.

Fig. 4 shows a double ended coupling for joining two elastic cords or ropes 19. This is similar to the coupling of Fig. 2 but the flexible sleeve is omitted and the annular springs 15 directly engage the ropes 19.

Fig. 5 shows a single ended coupling of similar construction for joining an elastic cord 19 to a terminal hook 20 for securing it to a piece of equipment.

Fig. 6 shows a double ended coupling, similar to that of Fig. 2 and including a flexible sleeve 17, for joining together two electric cables 21.

Fig. 7 shows a single ended coupling, similar to that of Fig. 3, for joining an electric cable 21 to a piece of equipment.

Fig. 8 shows a similar single ended coupling for joining a solid bar 22 to a piece of equipment.

Fig. 9 shows a double ended coupling of the kind shown in Fig. 2 utilised for joining together two solid bars 22.

In the coupling shown in Fig. 10, a flexible tube 11, e.g. of nylon, has a rubber seal 25 fitted between its end and the body 12. The nut 13A contains an annular coiled spring 15 and two metal washers 26, 27. The washer 27 has an internal cone and is located between the spring 15 and the end of the nut and the other washer 26 is located

between the spring 15 and the seal 25. The spring 15 and the coned inner face of the washer 27 provide a lock to prevent the tube 11 from pulling out of the coupling under the action of tension loads. In an alternative arrangement the washer 27 may be omitted and a conical face provided on the nut 13A.

Figs. 11-16 show various forms of coupling suitable for use with ropes or electric cables.

In the coupling shown in Fig. 11, the spring 15 is compressed by the nut 13 against the rope 21 and the body 12 has holes 28 whereby it may be secured, e.g. by screws, to a support, for example, on a lorry.

A coupling of this construction is useful for the purpose of tying down and fastening the ropes used for securing a load to a lorry. Once the rope is pulled taut and the nut 13 has been screwed tight, the rope will be held firmly in place.

The coupling shown in Fig. 12 is designed for securing an electrical cable to a switch box or a machine. As shown, the body 12 of the coupling is screwed to a fitting 29 on the machine, and an elastic washer 30 is inserted between the body 12 and the cable 21A. The annular coiled spring 15 cooperates with the coned surface of the nut 13 to ensure that the cable cannot be pulled out of the machine.

The coupling shown in Fig. 13 is suitable for securing a cable 21A to a switch box 31 in situations where an explosive mixture of gases may be present. The nut 13 is screwed to an extension 32 of the switch box 31. Within the extension 32 are an elastic ring 33 and a metal collar 34 which supports the spring 15. When the nut 13 is screwed tight the ring 33 is compressed against the cable 21A so isolating the switch box 31 from the surrounding atmosphere and ensuring that any spark occurring in the switch box cannot ignite the gas mixture.

If the cable 21A is of the type containing beneath its outer casing a metal braiding which automatically switches off the current supply in case of earthing, a pull on the cable sufficient to tear it from its anchorage in the switch box will cause the spring 15 to damage the outer casing sufficiently to make contact with the metal braiding and so switch off the current before the cable is torn from its anchorage.

In the construction shown in Fig. 14 a collar 35 is placed around the cable 21A beneath the spring 15 to protect the cable from damage by the spring.

Fig. 15 shows a double ended coupling for use with two sections 21A of cable joined and individually insulated in the conventional manner. A rubber sleeve 36 is provided over the joint and within the coupling. This form of coupling is also suitable for joining rigid pipes.

Fig. 16 shows a construction employing

two annular coiled springs in tandem, the second spring 15A being held in contact with the cable 21A by a second internally coned nut 13A screwed to an extension of the first nut 13. This tandem arrangement of springs can also be used in any of the couplings shown in Figs. 11—15.

The couplings hereinbefore described with reference to Figs. 1a, 1b, 2, 3 and 10 are particularly suitable for attachment to rigid pipes. It is however to be understood that they may also be employed for attachment to semi-rigid pipes and tubes made for example from polythene.

In any of the constructions illustrated, the coiled spring 15 may be replaced by a rubber O-ring.

WHAT WE CLAIM IS:—

1. A coupling for attachment to an elongated non-tubular flexible member of circular cross section, such for example as a rope or an electric cable, comprising an externally screw-threaded tubular body having an internal diameter which is larger than the external diameter of said member, a nut adapted to screw on to said body and having a conical internal surface and an annular coiled spring which fits over the end of said member and is compressed against it to clamp the member by the conical surface of the nut when the nut is screwed on to the body.

2. A coupling for attachment to an elongated rigid tubular or non-tubular member of circular cross-section, such for example as a pipe or a bar, comprising a flexible sleeve to fit over said member, an externally screw-threaded tubular body having an internal diameter which is larger than the external diameter of the sleeve, a nut adapted to screw on to said body and having a conical internal surface and an annular coiled spring which fits over the sleeve and is compressed against it to clamp it to said member by the conical surface of the nut when the nut is screwed on to the body.

3. A coupling as claimed in claim 1, for securing two elongated non-tubular members end to end which is double ended, the body being externally threaded at both ends for cooperation with internally coned nuts each containing an annular coiled spring to secure the coupling to said members.

4. A modification of the coupling claimed in claim 1, for securing a flexible hose to a rigid pipe fitted within it, wherein the bore of the tubular body is such as to fit the rigid pipe.

5. A coupling as claimed in claim 2 which is double ended, the body being externally threaded at both ends for cooperation with internally coned nuts each containing an annular coiled spring to secure the flexible sleeve to two aligned rigid members.

6. A coupling as claimed in claim 2 for securing a rigid pipe to a flexible pipe wherein the body has an axially extending spigot directed away from the rigid pipe and arranged to fit into the flexible pipe, and is also threaded at the spigot end for cooperation with an internally coned nut containing an annular coiled spring for clamping the body to the flexible pipe.

7. A modification of the coupling claimed in claim 2, in which the rigid member is adjustable in the body and the spring bears directly on the rigid member and without the intervention of a flexible sleeve.

8. A coupling as claimed in claim 1, in which the nut has an external thread at the end remote from the body and including a further internally coned nut cooperating with said external thread and containing a second annular coiled spring for clamping the elongated member.

9. A coupling for attachment to a flexible pipe comprising a flexible seal to fit over the end of the pipe, an externally screw-threaded body to fit over the seal, and a nut adapted to screw on to the body and containing an annular coiled spring, a washer disposed between the spring and the seal, and an internally coned portion in the form of a further washer disposed between the spring and the end of the nut or forming part of the nut, the spring and the coned portion providing a lock on the pipe to retain it against pulling out of the coupling.

10. A modification of the coupling claimed in claim 1 of Specification No. 714028 wherein the annular coiled spring is replaced by a rubber O-ring.

11. A coupling as claimed in any of claims 1—8, modified by the substitution of a rubber O-ring for the annular coiled spring or each annular coiled spring.

12. A coupling substantially as described herein with reference to any of the Figures of the drawings accompanying the Provisional and Complete Specifications.

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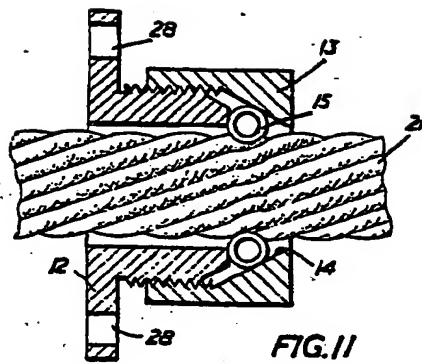


FIG. 11

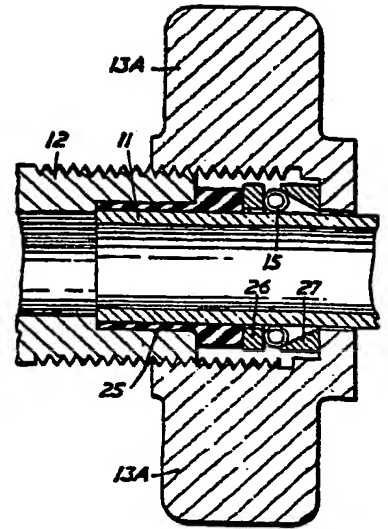


FIG. 10

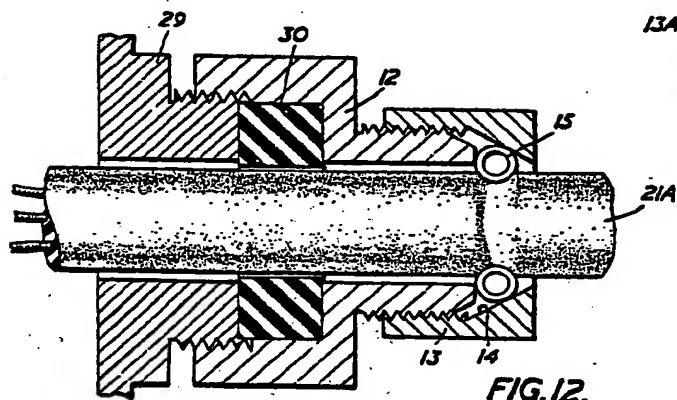


FIG. 12.

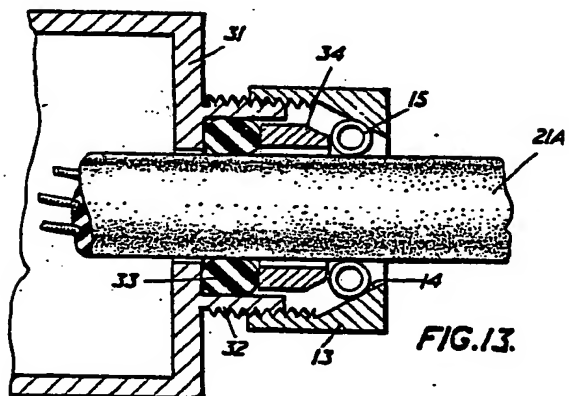


FIG. 13.

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COMPLETE SPECIFICATION

2 SHEETS

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Sheets 1 & 2

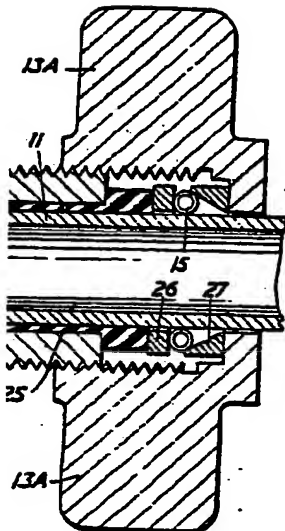


FIG. 10

21A

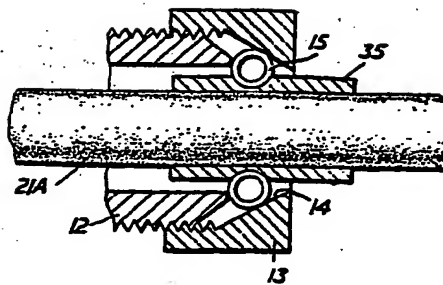


FIG. 14.

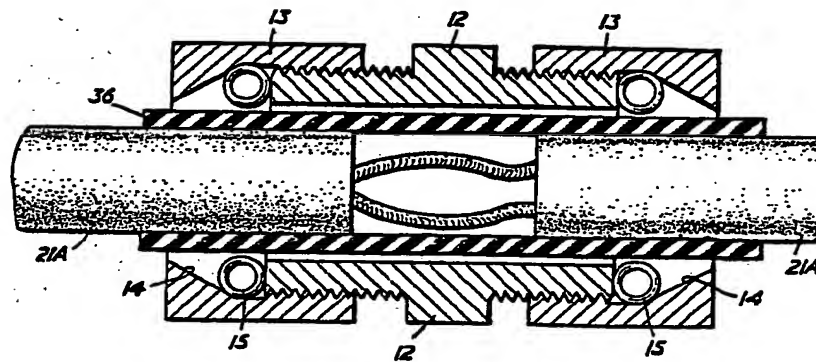


FIG. 15.



FIG. 13.

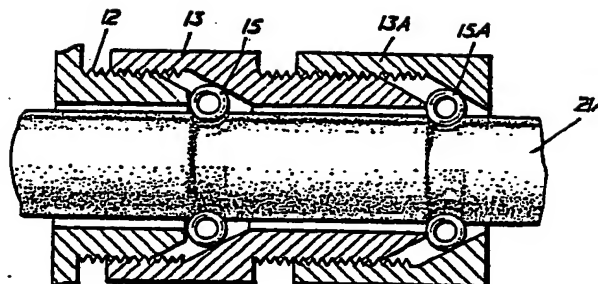


FIG. 16.

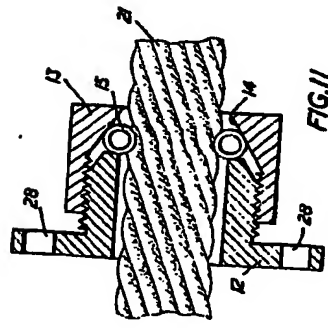


FIG. 11

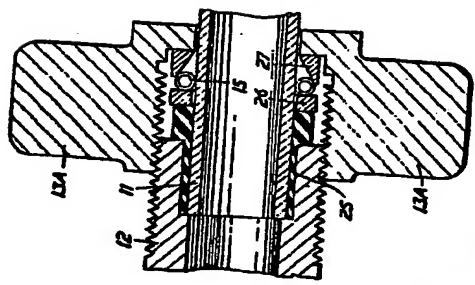


FIG. 10

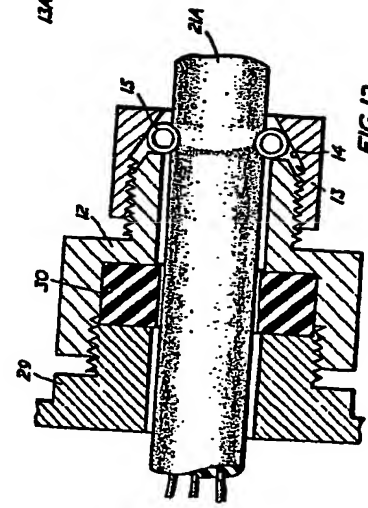


FIG. 12

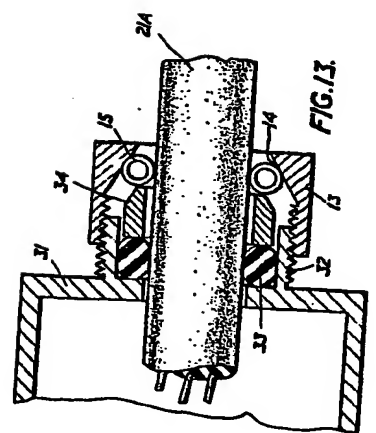


FIG. 13

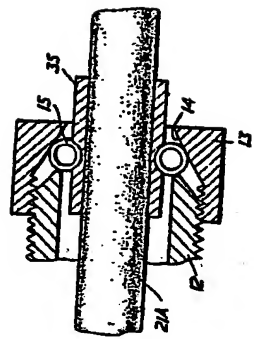


FIG. 14

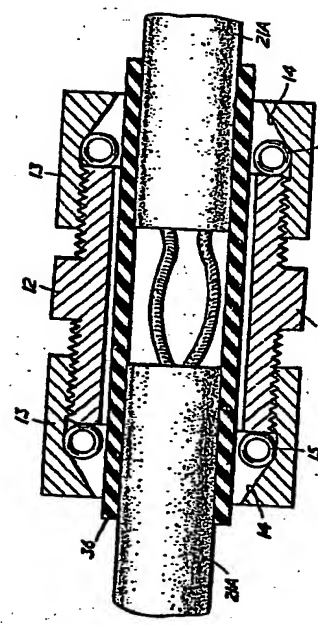


FIG. 15

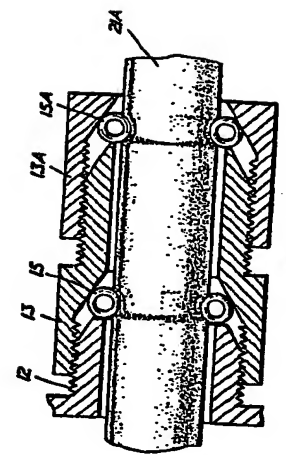


FIG. 16

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3 SHEETS

PROVISIONAL SPECIFICATION
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Sheet 1

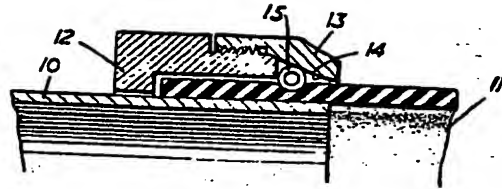


FIG. 1a.

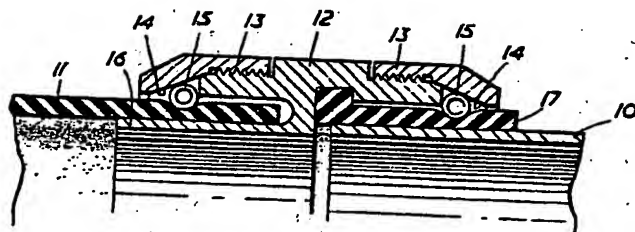


FIG. 1b.

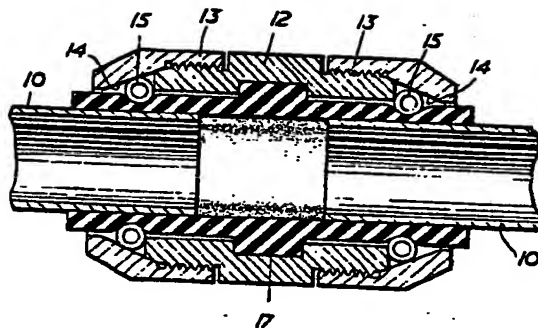


FIG. 2.

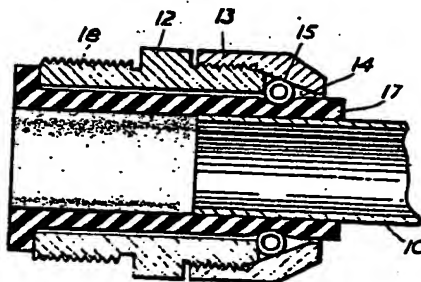


FIG. 3

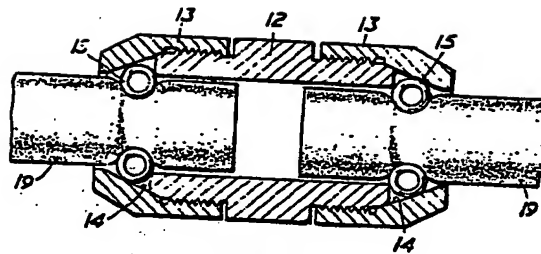


FIG. 4.

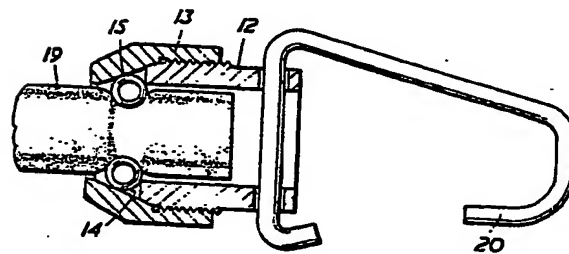


FIG. 5.

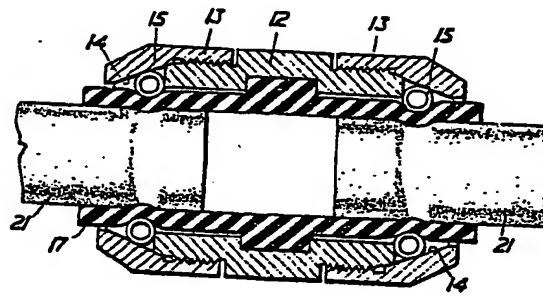


FIG. 6.

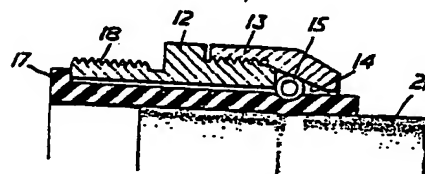


FIG. 7.

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3 SHEETS

PROVISIONAL SPECIFICATION
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Sheets 2 & 3*

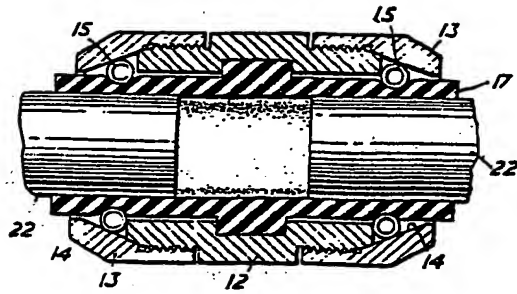


FIG. 9.

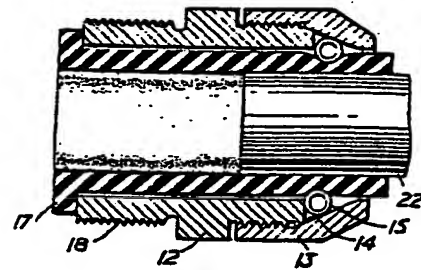


FIG. 8.

